

## CLAIMS

1. Coiling device to coil rolled or drawn long products, comprising a mandrel (11), arranged cantilevered and rotatable with respect to a central longitudinal axis (X),  
5 on which mandrel (11) said long products are able to be wound in adjacent and superimposed spirals (33), in order to form a compact coil (31) having the geometric shape of a circular ring with lateral flanks substantially orthogonal, or very angled, with respect to said central longitudinal  
10 axis (X), wherein said mandrel (11) comprises a flange (12) substantially orthogonal, or very angled, with respect to said central longitudinal axis (X) and able to define a first lateral flank of said coil (31), and wherein said mandrel (11) also comprises first arm elements (13), able  
15 to define the cylindrical surface of the core that forms said coil (31), and second arm elements (14), opposite said flange (12), and able to define a second flank of said coil, said first and said second arm elements (13, 14) being mobile between a first coil-forming position and a  
20 second coil-removal position, characterized in that said second arm elements (14) are provided with preventing means (40) able to contact said first arm elements (13), in order to prevent said first arm elements (13) from moving from said first coil-forming position to said second coil-  
25 removal position until said second arm elements (14) are in said first coil-forming position.
2. Coiling device as in claim 1, characterized in that said first arm elements (13) in said first position are substantially parallel to said central longitudinal axis  
30 (X), while in said second position they are inclined with respect to said central longitudinal axis (X), so as to define a substantially truncated cone surface converging towards the cantilevered end of said mandrel (11).

3. Coiling device as in claim 1 or 2, characterized in that said first arm elements comprise a plurality of axial arms (13) arranged at intervals around said central longitudinal axis (X).

5 4. Coiling device as in claim 1, 2 or 3, characterized in that said second arm elements (14) in said first position are substantially orthogonal, or very angled, with respect to said central longitudinal axis (X), while in said second position they are substantially parallel to said central  
10 longitudinal axis (X) and outside the space occupied by said formed coil (31).

5. Coiling device as in any claim hereinbefore, characterized in that said second arm elements comprise a plurality of containing arms (14) arranged at intervals  
15 around said central longitudinal axis (X).

6. Coiling device as in claim 5, characterized in that said containing arms (14) are pivoted on said mandrel (11), by means of respective pins (20), so that during their movement from said position to form said coil (31) to said  
20 position to remove said coil (31), they do not interfere with the spirals (33) of said formed coil (31).

7. Coiling device as in any claim hereinbefore, characterized in that said flange (12) comprises a front wall (135) mobile parallel to said central longitudinal  
25 axis (X) in order to be positioned axially in a desired position.

8. Coiling device as in any claim hereinbefore, characterized in that said flange (12) comprises a deposition ring (28) cooperating with said first arm  
30 elements (13), in order to define the cylindrical winding surface of the first layer of said spirals (33) of said coil (31).

9. Coiling device as in any claim hereinbefore,

characterized in that said second arm elements (14) comprise a supporting surface (27) able to cooperate with the most external spiral of the first layer of spirals (33) of said coil (31).

5 10. Coiling device as in any claim hereinbefore, characterized in that said mandrel (11) also comprises a substantially cylindrical central body (30) on which said first and said second arm elements (13, 14) are pivoted.

11. Coiling device as in claim 10, characterized in that  
10 first actuation means (16) are mounted on said central body (30) in order to command the displacement of said first arm elements (13) between one or the other of said first and second positions.

12. Coiling device as in claim 11, characterized in that  
15 said first actuation means comprise levers (16) pivoted on said central body (30).

13. Coiling device as in claim 10, 11 or 12, characterized in that temporary positioning and clamping means (22), arranged on said central body (30), are associated with  
20 said first arm elements (13).

14. Coiling device as in any claim from 10 to 13 inclusive, characterized in that control means (36), arranged on said central body (30), are associated with said first arm elements (13) in order to control their first position.

25 15. Coiling device as in any claim from 10 to 14 inclusive, characterized in that second actuation means (18, 19, 26, 118, 119) are mounted on said central body (30) in order to command the displacement of said second arm elements (14) between one or the other of said first and second  
30 positions.

16. Coiling device as in claims 5 and 15, characterized in that said second actuation means comprise toothed elements (26) associated with said containing arms (14) and

cooperating with rack means (18) or endless screw means (118).

17. Coiling device as in claims 12 and 16, characterized in that said levers (16) and said rack means (18) or said  
5 endless screw means (118) are driven by rod means (17).

18. Coiling device as in claim 17, characterized in that said rod means comprise a rod (17) arranged coaxial with said central longitudinal axis (X) and mobile axially between two defined positions.

10 19. Coiling device as in claim 17, characterized in that said rod means comprise a rod (17) arranged coaxial with said central longitudinal axis (X) and able to rotate, in one direction or another, by an angle of defined amplitude.

20. Coiling device as in claim 18 or 19, characterized in  
15 that said rod (17) is hollow inside.

21. Coiling method to coil rolled or drawn long products, by means of a mandrel (11), arranged cantilevered and rotatable with respect to a central longitudinal axis (X), on which mandrel (11) said long products are able to be  
20 wound in adjacent and superimposed spirals (33), in order to form a compact coil (31) having the geometric shape of a circular ring with lateral flanks substantially orthogonal, or very inclined, with respect to said central longitudinal axis (X), wherein said mandrel (11) comprises a flange (12)  
25 substantially orthogonal, or very inclined, with respect to said central longitudinal axis (X) and able to define a first lateral flank of said coil (31), characterized in that in a first step to form said coil (31), said mandrel (11) has first arm elements (13) substantially parallel to  
30 said central longitudinal axis (X) which define the cylindrical surface of the core that forms said coil (31), and second arm elements (14), opposite said flange (12), which define a second lateral flank of said coil (31), and

in that at the end of said first step to form said coil (31), said first and said second arm elements (13, 14) are displaced to a position of non-interference with said coil (31), in order to allow said coil (31) to be removed  
5 axially from the cantilevered end of said mandrel (11).

22. Coiling method as in claim 21, characterized in that in said position of non-interference said first arm elements (13) are inclined with respect to said central longitudinal axis (X), so as to define a substantially truncated cone  
10 surface converging towards said cantilevered end of said mandrel (11).

23. Coiling method as in claim 21 or 22, characterized in that in said position of non-interference said second arm elements (14) are substantially parallel to said central  
15 longitudinal axis (X) and outside the space occupied by the formed coil (31).

24. Coiling method as in any claim from 21 to 23 inclusive, characterized in that the displacement of said first and second arm elements (13, 14) to said position of non-  
20 interference with said coil (31) is achieved by rod means (17) arranged coaxial with said mandrel (11).

25. Coiling method as in any claim from 21 to 24 inclusive, characterized in that said second arm elements comprise a plurality of containing arms (14) arranged at intervals  
25 around said central longitudinal axis (X) and pivoted on a central body (30) of said mandrel (11), and in that said containing arms (14) are pivoted on said mandrel (11) by means of respective pins (20), in such a manner that during their movement from the position assumed in said first step  
30 to form the coil (31) to said position of non-interference, they do not interfere with said spirals (33) of said formed coil (31).

26. Coiling method as in any claim from 21 to 25 inclusive,

characterized in that said flange (12) comprises a deposition ring (28) cooperating with said first arm elements (13) in order to define the cylindrical winding surface of the first layer of spirals (33) of said coil (31).

27. Coiling method as in any claim from 21 to 26 inclusive, characterized in that said second arm elements (14) comprise a supporting surface (27) able to cooperate with the most external spiral of the first layer of spirals (33) of said coil (31).

28. Coiling method as in claim 24, characterized in that the displacement of said first arm elements (13) between one or the other of the positions to form the coil (31) and of non-interference is achieved by first actuation means (16) connected to said rod means (17).

29. Coiling method as in any claim from 21 to 28 inclusive, characterized in that temporary positioning and clamping means (22), arranged on a central body (30) of said mandrel (11), are associated with said first arm elements (13).

30. Coiling method as in any claim from 21 to 29 inclusive, characterized in that control means (36) associated with said first arm elements (13) control the coil-forming position of said first arm elements (13).